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# ***WATER SUPPLY OUTLOOK FOR WASHINGTON***

and  
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE,

and

DEPARTMENT of WATER RESOURCES STATE of WASHINGTON

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, and other Federal, State and Private organizations.

AS OF  
MAY 1, 1969



## TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1400 snow courses in Western United States and in the Columbia Basin in British Columbia. In the near future, it is anticipated that automatic snow water equivalent sensing devices along with radio telemetry will provide a continuous record of snow water equivalent at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

### PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, Western Regional Technical Service Center, Room 209, 701 N. W. Glisan, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	P. O. Box "F", Palmer, Alaska 99645
Arizona	6029 Federal Building, Phoenix, Arizona 85205
Colorado (N. Mex.)	12417 Federal Building, Denver, Colorado 80521
Idaho	P. O. Box 38, Boise, Idaho 83707
Montana	P. O. Box 98, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1218 S. W. Washington St., Portland, Oregon 97205
Utah	4012 Federal Building, Salt Lake City, Utah 84111
Washington	360 U.S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 340, Casper, Wyoming 82602

### PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P. O. Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia



# ***WATER SUPPLY OUTLOOK FOR WASHINGTON***

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FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

*Issued by*

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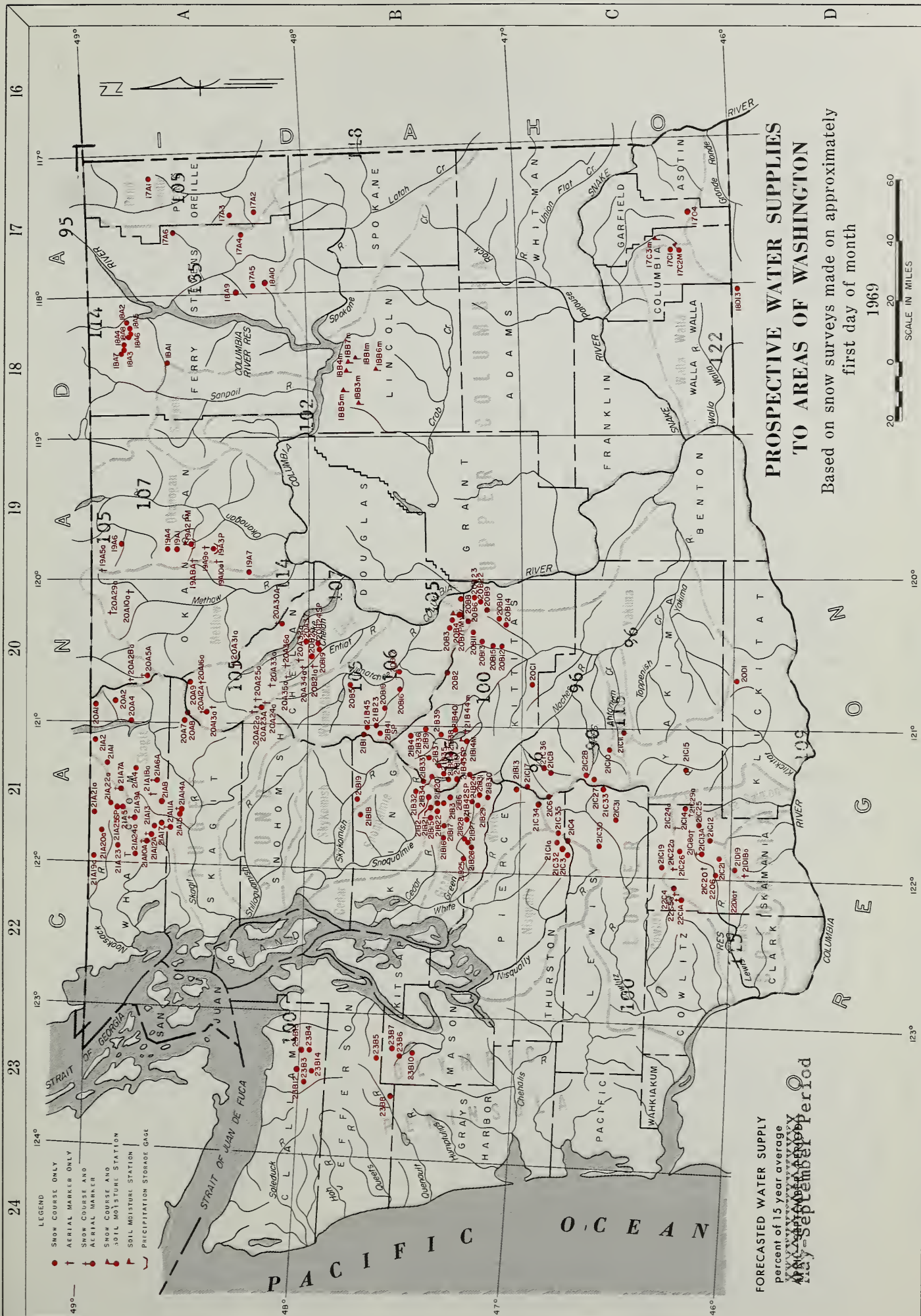
*Report prepared by*

**ROBERT T. DAVIS, Snow Survey Supervisor**

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SPOKANE, WASHINGTON 99201









# INDEX to WASHINGTON SNOW COURSES, SOIL MOISTURE STATIONS and PRECIPITATION STORAGE GAGES

NAME	NUMBER	SEC.	TRP.	RANGE	ELEV.
UPPER COLUMBIA DRAINAGE					
Pend Oreille River					
Boyer Mountain	17A2	7	31N	43E	5550
Bunchgrass Meadow	17A1	24	31N	44E	5900
Minchew Creek	17A3	30	33N	43E	2997
Kettle River					
Boulder Road	18A2	36	33N	36E	1450
Butte Creek	18A3	28	33N	35E	1070
Cabin Creek	18A4	5	34N	36E	3170
Goat Creek	18A5	26	33N	35E	3545
Snow Caps Creek	18A6	3	38N	46E	2150
Snow Caps Trail	18A7	5	38N	36E	2720
Summit G. S.	18A7	20	39N	35E	4900
Colville River					
Baird	17A5	19	36N	42E	3215
Carlson	18A9	34	32N	38E	2885
Chevelah	17A4	11	32N	41E	4925
Stranger Mountain	17A5	26	31N	38E	4790
Togo	18A10	6	29N	38E	3370
Sonpoil River					
Sherman Creek Pass	18A1	19	36N	35E	5350
Okanogan River					
Clark	19A8a	2	36N	23E	7000
Huckanuck	19A9a	20	36N	24E	6750
Nutton Creek No. 1	19A1	30	37N	22E	5700
Nutton Creek No. 2	19A2	10	37N	22E	6000
Payday Creek	20A28a	32	40N	18E	4300
Rusty Creek	19A3p	18	35N	22E	4000
Salmon Meadows	19A2FM	33	37N	22E	4500
Starvation Mtn.	19A10a	15	35N	23E	6750
Touts Coulee	19A6	30	39N	23E	2845
Methow River					
Billy Goat Pass	20A10a	10	38N	20E	6400
Dollar Watch	20A29a	8	39N	20E	7000
Harts Pass	20A5A	7	37N	18E	6500
Horseshoe Basin	19A5A	15	40N	23E	7000
Loup Loop	19A7	36	34N	23E	4650
Chelon Lake Basin					
Cloudy Pass	20A22a	12	31N	15E	6500
Greenwood Flat	20A25a	3	31N	16E	3540
Little Meadows	20A24a	8	31N	16E	5275
Lyman Lake	20A23a	18	31N	16E	5900
Park Creek Flat	20A13a	18	34N	16E	2220
Park Creek Ridge	20A12a	7	34N	16E	4600
Petersons	20A16a	3	34N	17E	3730
Rainy Pass	20A9	21	35N	17E	4780
Safety Harbor	20A30a	32	31N	20E	6300
War Creek Pass	20A31a	34	33N	18E	6500
Enriat River					
Brief	20B19	34	28N	19E	1600
Entiat Meadows	20A33a	28	31N	17E	4800
Entiat River Trail	20A34a	2	29N	17E	3150
Fox Camp	20A36a	17	30N	18E	6510
Pope Ridge	20B20	22	29N	18E	4300
Pope Ridge Snow Pillow	20B24SF	22	29N	18E	4300
Pugh Ridge	20A32a	34	30N	18E	6400
Shady Pass	20A37	20	29N	19E	6200
Snow Brushy	20A35a	21	30N	17E	3850
Tonny Creek	20B21a	10	28N	18E	5300
Wenatchee River					
Berne-Mill Creek	21B23	7	26N	15E	2925
Berne-Mill Creek (New)	21B1ASP	13	26N	14E	3240
Blevett Pass No. 2	20B2	35	22N	17E	4270
Chiwaukum G. S.	20B16	4	25N	17E	1810
Lake Wenatchee	20B5	33	27N	17E	1970
Leavenworth R. S.	20B17	1	24N	17E	1127
Merritt	20B18	4	26N	16E	2140
Stevens Pass	21B1	14	26N	13E	4070
Stevens Pass Sand Shed	21B45	12	26N	19E	3700
Lewis River					
Blue Lake	21C22a	19	9N	8E	4800
Bob's Trail	21C21	25	8N	7E	2200
Calamity Ridge	22D1a	8	5N	5E	2500
Council Pass	21C18a	24	9N	9E	4200
White Salmon River					
Cultus Creek	21C12	35	7N	8E	4000
Snoqualmie River					
Benders Air Strip	21B32	16	22N	10E	1635
Challie Meadows	21B2	19	22N	11E	3625
South Fork Toit	21B18	26	26N	9E	1900
Skokomish River					
Lake Elizabeth	21B19	33	26N	10E	2900
Cedar River					
City Cabin	21B3	10	21N	10E	2390
Mt. Gardner	21B21	30	22N	10E	2500
Mt. Gardner Aux.	21B22	31	22N	10E	2500
Mt. Lindsay	21B16	8	22N	9E	3000
Mt. Washington	21B15	8	22N	9E	2400
Rex River	21B17	11	21N	10E	3000
South Fork Cedar	21B6	24	21N	10E	3000
Tinkham Creek	21B20	1	21N	10E	3400
Green River					
Airstrip	21B24	18	20N	11E	1800
Charley Creek	21B25	27	21N	8E	1200
Cougar Mountain	21B2SP	21	21N	9E	3200
Grass Mountain No. 1	21B26	21	20N	8E	4000
Grass Mountain No. 2	21B27	14	20N	8E	2900
Grass Mountain No. 3	21B28	12	20N	8E	2100
Lester Creek	21B29	36	20N	10E	3100
Sawmill Ridge	21B31	5	19N	11E	4700
Snowshoe Butte	21B43SP	14	20N	11E	5000
Stampede Pass	21B10	25	21N	11E	3000
Twin Camp	21B30	18	19N	11E	4100
White River					
Corral Pass	21B13	30	18N	11E	6000
White River Campground	21C34	4	16N	9E	
Nisqually River					
Ghost Forest	21C4	23	15N	8E	4550
Longmire	21C3	29	15N	8E	2760
Pardise Park (New)	21C35	13	15N	8E	
Stem Glade	21C1	13	15N	8E	5050
Cowlitz River					
Coyuse Pass	21C6	15	16N	10E	5300
Mosquito Meadows	21C19	33	10N	7E	4100
Quanaquosh	21C32	28	15N	10E	2870
Packwood Lake	21C31	21	13N	10E	5000
Pigtail Peak	21C33	11	13N	11E	4507
Potato Hill	21C14	36	10N	10E	4507
William Creek	21C30	3	13N	8E	3250
PUGET SOUND DRAINAGE					
Skagit River					
Divide Meadow	21C29a	21	9N	10E	5600
Grand Meadow	21C25	8	8N	9E	3500
Lone Pine Shelter	21C26	28	8N	7E	3000
Marlin Mountain	22C5a	24	8N	5E	3200
New Muddy River	22C6	36	8N	6E	7000
Oldman Pass	21D19	22	6N	7E	3100
Plains of Abraham	22C1a	35	9N	5E	4470
Smith Creek Road	21C20a	20	9N	6E	2100
Spencer Meadow	21C20a	16	9N	7E	3400
Surprise Lakes	21C13a	14	7N	8E	4250
Table Mountain	21C24a	20	9N	8E	4200
Timbered Peak	21D18a	36	6N	6E	3000
Lewis River (continued)					
Beaver Creek Trail	21A4	35	30N	12E	3200
Beaver Park	21A1	37	30N	12E	3600
Devils Pass	20A2	34	32N	11E	5900
Freezeout Creek Trail	20A1	14	40N	14E	3500
Freezeout Meadows	20A2	14	40N	14E	5000
Lake Hozomeen	21A2	19	40N	14E	2400
Meadows Cabins	20A8	29	34N	14E	1700
Thunder Basin	20A7	15	35N	14E	4200
Baker River					
Dock Butte	21A11a	8	36N	8E	3700
Pony Pass	21A7a	19	39N	11E	5200
Passer Pass	21A4a	17	39N	11E	5400
Yonon Kullian	21A7	31	37N	14E	400
Karlun Lake	21A7a	23	38N	14E	3600
Mount Blum	21A18a	20	38N	10E	5800
Rocky Creek	21A12a	20	37N	8E	2100
Schriber's Meadow	21A10a	18	37N	8E	3400
S. F. Thunder Creek	21A14a	20	36N	9E	2200
Sulphur Creek	21A13	22	37N	9E	1600
Three Mile Creek	21A15	18	36N	9E	1600
Watson Lakes	21A	25	37N	9E	4500
Nooksack River					
Bald Mountain	21A19a	7	47N	7E	4400
Canyon	21A20a	20	40N	8E	5100
Glacier Creek	21A23	4-10	39N	7E	3700
Hazegran Pass	21A22a	8	39N	7E	5000
Manama Park	21A24a	2	37N	7E	4500
Panorama	21A5	17	39N	9E	4300
Panorama Snow Pillow	21A25SP	17	39N	9E	4300
Twin Lakes	21A21a	16	40N	9E	5200
OLYMPIC PENINSULA					
Dungeness River					
Deer Park	23B4	1	22N	5W	5200
Morse Creek					
Cox Valley	23B14	29	20N	6W	4850
Deer Park G. S.	23B13	25	28N	5W	5425
Morse Creek	23B12	25	29N	7W	5425
Elwha River					
Hurricane	23B3	36	29N	7W	4500
Skokomish River					
Black and White	23B7	17	24N	5W	4200
Black and White Lakes	23B6	16	24N	5W	4700
Four Stream	23B10	1	23N	6W	3000
Home Sweet Home	23B5	20	25N	5W	5200
Sundown Pass	23B8	25	24N	7W	3900
LEGEND					
NUMBERING SYSTEM EXAMPLE					
21A7	SNOW COURSE ONLY				
21A7a	AERIAL MARKER ONLY				
21A7a	SNOW COURSE AND AERIAL MARKER				
21A7m	SNOW COURSE AND SOIL MOISTURE STATION				
21A7m	SOIL MOISTURE STATION				
21A7p	SNOW COURSE AND PRECIPITATION STORAGE GAGE				
21A7p	PRECIPITATION STORAGE GAGE				
21A7SP	SNOW PILLOW				



WATER SUPPLY OUTLOOK  
State of Washington

May 1, 1969

\* \* \* \* \*

\* Precipitation and runoff are the key factors that have occurred during the month of April. The rivers of the State have flowed well above normal except for the Similkameen, Cowlitz and Chehalis. Precipitation was well above normal except for the central area and the southwest slopes of the Cascades. These high flows have caused a general reduction in the water supply forecasts and the above normal precipitation tried to increase the amount of water yet to come from the watersheds. The result of these two opposing conditions was very little change within the State. In some instances the precipitation outweighed the runoff and forecasts went up percentage-wise and in other instances the reverse was true.

\* At the present time the outlook for water supply can still be considered very good for all areas within the State and from tributary basins flowing into Washington. Snowpack, as a factor in forecasting, is not as strong on the first of May as in previous months because it is generally on the decrease. Only a few high elevation snow courses, such as Harts Pass, Jasper Pass, and Easy Pass, increased their water equivalent over that which was measured last month. This normal increase occurred this year as did a generally normal decrease on most other snow courses. Our warm days, the cause of our high flows, has taken off the snowpack at the lower elevations and many of the mid-range snow courses were depleted slightly more than average. This warm temperature affected the higher elevation snow courses also but not to the extent as reported above.

\* Last month the densities were reported to be abnormally high -- similar to May of normal years. This month the densities have not changed from that which was reported last month to any extent. The ripeness of the snow last month was stable with very little change. Of course, snow can only get so dense before melting occurs and it runs off. The watersheds, taken individually, and comparing the snowpacks to last year, indicate the Yakima 468% greater than last year down to the Okanogan which has a snowpack that is now 3% less. Comparing the watersheds to normal, the Walla Walla watershed, previously reported extremely high, now has a snowpack that is 21% below normal. The high area in the State is the Lewis, with a snowpack that is 45% greater than normal. The interesting snow covers in the Green and Cedar watersheds are not measured on the first of May but the conditions are that these extensive low-elevation snowpacks have run off. Although the runoff has been very high, flooding has been very minor and nothing compared to what could have occurred under adverse weather conditions of warm days, warm nights, and warm rains.

\* \* \* \* \*

SNOW COVER

The heavy snow covers reported last month have all been substantially decreased. The low-elevation snow cover which made up the high portion of the percentage figures has run off leaving near normal amounts of



water in the mountains for later spring runoff. A few classic examples are the reduction of the Walla Walla River from 69% above normal to 21% below and the reduction of the Kettle watershed from 62% above normal to normal. This comparison is not a true evaluation of snow cover from April 1 to May 1 because so many more snow courses at all elevations are measured on April 1 than are measured as of May 1. We know what the maximum snow cover over the State was and now we are watching how it depletes. This can be done with fewer snow courses and those at higher elevations.

## RESERVOIRS

Generally speaking, the reservoirs are in better shape than they are normally for this time of year and all are expected to fill with the spring runoff. The power reservoirs on the main stem and tributaries have above normal amounts of water in storage and this is a result of early filling to maintain the low water elevation in FDR Lake. Construction at the third power house should permit the reservoir to start filling about the middle of May and filling will take place in an orderly manner with storage maintained for later flood control purposes. Irrigation reservoirs have near normal amounts of water in storage with the Yakima reservoir holding 802,700 acre-feet. Coeur d'Alene Lake has its usual above capacity storage.

## PRECIPITATION

The precipitation as reported by stations in Washington and British Columbia had a wide range--from 39% to 439% of normal. All of the upper Columbia in Canada had well above normal precipitation during the month--as high as the aforementioned 439%. The low area within the basin occurred in the central portion of Washington on the Yakima, Wenatchee and Chelan watersheds. One other low area was on the southwest slopes of the Cascades with the northwest slopes having a normal amount of rainfall. All other areas had well above normal precipitation during the month of April.

## SOIL MOISTURE

As can be expected the soil mantle continues to wet up with the melting of the snowpacks. The soil moisture conditions as of the first of May are not as critical to water supply forecasts as earlier measurements. The voids in the soil mantle have been accounted for in the earlier forecasts and are now in the process of filling up from the melting snow.

## STREAMFLOW

As stated above, streamflow during the month of April was generally excessive in all areas. The high in the State occurred on the Palouse with a 138% above normal runoff and the low occurred on the Similkameen with a 13% below normal runoff. The main stem had well above normal flows with Birchbank 76% above and The Dalles 66% above. There is a good correlation between the amount of runoff during April and the depletion of the snowpack during the month.





# STREAMFLOW FORECAST - MAY 1969

The following summarized runoff forecasts are based principally on mountain snow cover and on the assumption that precipitation and temperature will be near average from the present time to the end of the forecast period. Appreciable deviations from normal of temperature and/or precipitation will correspondingly modify these forecasts.

Streamflow figures for 1968 are preliminary and subject to revision.

Basin, Stream and Station	Forecast Runoff 1969	Seasonal Streamflow in Thousands of Acre-Feet					
		% 15-Yr. Avg.	Fore- cast Period	Measured Runoff			15-Yr. Avg. 1953-67
				1968	1967	1966	
<u>COLUMBIA BASIN</u>							
<u>Columbia River System</u>							
Columbia River							
at Birchbank <u>1/</u> ***	41400	95	May-Sep	44610	49836	42575	43582
	33700	97	May-Jul	33280	39220	32820	34697
	24000	99	May-Jun	20850	25570	21876	24256
Columbia River							
at Grand Coulee <u>1/</u>	64000	102	May-Sep	58640	69381	55829	62792
	53800	103	May-Jul	45520	57806	45027	52234
	40800	104	May-Jun	31450	41585	32163	39224
Columbia River							
bl. Rock Island Dam <u>1/</u>	72400	105	May-Sep	64570	76486	60694	68997
	60950	106	May-Jul	50660	64275	49296	57502
	46600	108	May-Jun	35130	46812	35478	43113
Columbia River							
at The Dalles, Ore. <u>1/</u>	10000	109	May-Sep	80470	100620	75010	92457
	85000	110	May-Jul	62870	84881	60348	77330
	66300	111	May-Jun	45350	63145	44552	59688
<u>Pend Oreille River System</u>							
Pend Oreille River							
bl. Box Canyon	14600	105	May-Sep	11600	15193	11358	13862
	13400	106	May-Jul	9720	14288	10380	12642
	11400	107	May-Jun	8100	12063	8656	10618
<u>Kettle River System</u>							
Kettle River							
nr. Laurier	1910	114	May-Sep	1702	1753	1184	1667
	1810	115	May-Jul	1567	1720	1131	1571
	1620	116	May-Jun	1406	1580	976	1393

1/ Observed flow corrected for storage in any of the following reservoirs which are above the station: Kootenay Lake, Hungry Horse, Flathead Lake, Pend Oreille Lake, F. D. Roosevelt Lake, Lake Chelan, Coeur d'Alene Lake, Brownlee, Noxon Reservoir and pumpage at F. D. Roosevelt Lake.

\*\*\* Forecasts made by Water Investigations Branch, Water Resources Service, Department of Lands, Forests, and Water Resources.





# Streamflow Forecasts - May 1969 (Cont.)

Basin, Stream and Station	Forecast Runoff 1969	Seasonal Streamflow in Thousands of Acre-Feet					
		% 15-Yr. Avg.	Fore- cast Period	Measured Runoff			15-Yr. Avg. 1953-67
				1968	1967	1966	

## Kettle River System (Cont.)

### Colville River

at Kettle Falls	132	135	May-Sep		86	43	98
	117	136	May-Jul		80	36	86
	104	137	May-Jun		73	31	76

## Spokane River System \*

### Spokane River

at Post Falls, Ida. <u>2/</u>	2500	118	May-Sep		2226	1560	2110
	2380	118	May-Jul		2166	1504	2015
	2200	118	May-Jun		2033	1412	1872

## Okanogan River System \*\*

### Similkameen River

nr. Nighthawk	1500	105	May-Sep	1307	1641	866	1431
	1400	106	May-Jul	1222	1571	803	1325
	1180	107	May-Jun	1028	1360	663	1103

### Okanogan River

nr. Tonasket	1720	107	May-Sep	1486	1736	909	1609
	1560	108	May-Jul	1348	1654	821	1449
	1300	109	May-Jun	1117	1426	667	1190

## Methow River System \*\*

### Methow River

nr. Pateros	1100	114	May-Sep	899	1217	582	969
	1020	114	May-Jul	833	1159	531	895
	860	115	May-Jun	790	995	436	748

## Chelan River System

### Chelan River

at Chelan <u>4/</u>	1230	107	May-Sep	1150	1310	860	1148
	1080	108	May-Jul	996	1175	747	1001
	820	109	May-Jun	725	910	559	752

\* Forecasts made by Morlan W. Nelson and J. Alden Wilson, Soil Conservation Service, Boise, Idaho.

\*\* These forecasts are based in part upon base flow data especially prepared and furnished for this purpose by the U. S. Geological Survey.

2/ Observed flow corrected for storage in Coeur d'Alene Lake and diversions by Spokane Valley Farms Company and Rathdrum Prairie Canals.

4/ Observed flow corrected for storage in Lake Chelan.



# Streamflow Forecasts - May 1969 (Cont.)

Basin, Stream and Station	Forecast Runoff 1969	Seasonal Streamflow in Thousands of Acre-Feet				
		% 15-Yr. Avg.	Fore- cast Period	Measured Runoff		
				1968	1967	1966
						15-Yr. Avg. 1953-67
<u>Chelan River System (Cont.)</u>						
Stehekin River						
at Stehekin	870	105	May-Sep	970	653	827
	740	106	May-Jul	834	543	695
	550	108	May-Jun	639	399	509
<u>Wenatchee River System</u>						
Wenatchee River						
at Plain	1240	105	May-Sep	1253	913	1183
	1120	106	May-Jul	1142	822	1053
	870	108	May-Jun	884	638	802
Wenatchee River						
at Peshastin	1700	106	May-Sep	1384	1703	1250
	1560	108	May-Jul	1203	1567	1136
	1220	110	May-Jun	932	1232	888
Stemilt Basin						
nr. Wenatchee	130*		May-Sep	146*	132*	--
<u>Yakima River System</u>						
Yakima River						
nr. Martin <u>5/</u>	124	105	May-Sep	80	105	94
	113	106	May-Jul	63	102	90
	94	117	May-Jun	56	91	78
Yakima River						
at Cle Elum <u>6/</u>	790	100	May-Sep	792	648	790
	720	102	May-Jul	726	581	707
	610	104	May-Jun	619	494	584
Yakima River						
nr. Parker	1280	96	May-Sep	1382	959	1339
	1280	97	May-Jul	1422	975	1319
	1150	98	May-Jun	1318	877	1174
Kachess River						
nr. Easton <u>8/</u>	107	105	May-Sep	61	91	77
	101	106	May-Jul	52	89	76
	87	107	May-Jun	47	80	68

\* Thousands of Miners' Inches.

5/ Observed flow corrected for storage in Lake Keechelus.

6/ Observed flow corrected for storage in Keechelus, Kachess and Cle Elum Lakes and diversion by Kittitas Canal.

7/ Observed flow corrected for storage in Keechelus, Kachess, Cle Elum, Bumping and Rimrock Lakes and diversions by Roza, Union Gap, New Reservation, Old Reservation and Sunnyside Canals.

8/ Observed flow corrected for storage in Lake Kachess.





## Streamflow Forecasts - May 1969 (Cont.)

Basin, Stream and Station	Forecast Runoff 1969	Seasonal Streamflow in Thousands of Acre-Feet					15-Yr. Avg. 1953-67
		%	Fore-	Measured Runoff			
		15-Yr. Avg.	cast Period	1968	1967	1966	
<u>Yakima River System (Cont.)</u>							
<u>Cle Elum River</u>							
nr. Roslyn <u>9/</u>	415	100	May-Sep	320	406	329	415
	380	101	May-Jul	272	380	306	375
	310	102	May-Jun	226	322	254	303
<u>Bumping River</u>							
nr. Nile <u>10/</u>	128	96	May-Sep	95	138	105	133
	117	97	May-Jul	82	130	96	121
	95	98	May-Jun	72	108	82	97
<u>American River</u>							
nr. Nile	108	96	May-Sep		120	94	112
	100	97	May-Jul		112	87	103
	81	98	May-Jun		92	72	83
<u>Tieton River</u>							
at Tieton Dam <u>11/</u>	195	90	May-Sep	157	225	162	216
	165	91	May-Jul	120	195	142	181
	127	92	May-Jun	93	154	113	138
<u>Naches River</u>							
nr. Naches <u>12/</u>	720	96	May-Sep		809	604	748
	650	97	May-Jul		743	543	668
	540	99	May-Jun		628	456	547
<u>Ahtanum Creeks</u>							
nr. Tampico <u>13/</u>	46	115	May-Sep		51	30	40
	41	116	May-Jul		47	26	35
	35	117	May-Jun		40	22	30
<u>Lower Columbia River System</u>							
<u>Mill Creek</u>							
nr. Walla Walla	22	122	May-Sep		16	13	18
	17	121	May-Jul		13	10	14
	15	125	May-Jun		12	8	12
<u>Lewis River</u>							
at Ariel <u>14/</u>	1100	115	May-Sep		856	934	956
	915	115	May-Jul		743	798	796
	760	116	May-Jun		638	644	657
<u>Cowlitz River</u>							
at Castle Rock <u>15/</u>	2110	100	May-Sep		2115	1933	2120
	1810	101	May-Jul		1853	1663	1789
	1450	102	May-Jun		1528	1299	1426

9/ Observed flow corrected for storage in Lake Cle Elum

10/ Observed flow corrected for storage in Bumping Lake.

11/ Observed flow corrected for storage in Rimrock Lake.

12/ Observed flow corrected for storage in Bumping and Rimrock Lakes and diversions by Tieton, Selah Valley, Wapatox Canals and City of Yakima.

13/ Observed flow of North and South Forks (combined).

14/ Observed flow corrected for storage in Lake Merwin, Yale and Swift Reservoirs.

15/ Observed flow corrected for storage in Mayfield Reservoir.





Streamflow Forecasts - May 1969 (Cont.)

Basin, Stream and Station	Forecast Runoff 1969	Seasonal Streamflow in Thousands of Acre-Feet				
		% 15-Yr. Avg.	Fore- cast Period	Measured Runoff		
				1968	1967	1966
						15-Yr. Avg. 1953-67

OLYMPIC PENINSULA

Dungeness River System

Dungeness River

nr. Sequim	153	100	May-Sep	191	149	153
	123	101	May-Jul	156	118	122
	89	103	May-Jun	111	81	86



# RESERVOIR STORAGE - 1000 Acre Feet

BASIN or STREAM	RESERVOIR	USABLE <sup>1/</sup> CAPACITY	1969	Measured 1968	(May) 1967	Normal*
<u>COLUMBIA</u>						
Spokane	Coeur d'Alene Lake	225.1	441.8	127.0	172.0	299.9
Columbia	Franklin D. Roosevelt Lake	5232.0	-1864.1	-284.2	899.1	2444.9
Columbia	Banks Lake	761.8	581.3	464.3	446.8	409.7
Okanogan	Conconully Reservoir	13.0	6.6	7.4	4.7	7.6
Okanogan	Salmon Lake	10.5	7.6	9.0	3.7	8.7
Chelan	Lake Chelan	676.1	229.1	449.6	42.1	210.0
<u>YAKIMA</u>						
Yakima	Keechelus Lake	157.8	107.9	141.4	109.6	120.6
Kachess	Kachess Lake	239.0	193.0	215.9	181.3	202.4
Cle Elum	Lake Cle Elum	436.9	323.4	385.3	280.2	323.2
Bumping	Bumping Lake	33.7	7.7	15.7	4.6	20.1
Tieton	Rimrock Lake	198.0	165.6	165.0	139.2	154.1
<u>PUGET SOUND</u>						
Skagit	Ross Reservoir	1202.9	546.5	993.0	732.7	695.4
Skagit	Diablo Reservoir	90.6	87.0	88.3	82.7	85.2
Skagit	Gorge Reservoir	9.8	8.0	8.8	8.2	--

<sup>1/</sup> Based on Active Storage

\* 15-year average 1953-67





# SOIL MOISTURE - MAY

Drainage Basin and Station	Number	Elev.	Profile Depth	(Inches) : Total : Capacity :	Soil Moisture Content (Inches) as of May 1) 1969	1968	1967
<u>CRAB CREEK</u>							
Creston-Kunz	18B1m	2440	48	13.6	11.4	7.0	10.8
Jack Woods	18B3m	2600	48	13.6	10.3	9.6	9.6
Krause	18B4m	2440	48	13.6	9.4	8.7	9.1
Sheffels	18B5m	2360	48	13.6	8.3	7.3	8.1
Sherman	18B7m	2440	48	13.6	8.6	8.6	8.1
Wheatridge	18B6m	2200	48	13.6	9.5	8.6	9.2
<u>OKANOGAN</u>							
Salmon Meadows	19A2M	4500	48	5.4	3.7	4.2	3.7
Trout Creek	3-M	3600	48	7.3	Late Report	6.3	5.4
<u>YAKIMA</u>							
Domery Flat	21B20m	2200	48	6.9	Late Report	4.9	4.9
Lake Cle Elum	21B14M	2200	48	12.8	Late Report	9.2	9.1
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	10.9	7.2	10.5
Helmers	17C2M	4400	48	12.0	11.2	11.3	11.3
<u>WENATCHEE</u>							
Upper Wheeler	20B7M	4400	48	12.7	Late Report	10.9	11.8

# FALL SOIL MOISTURE

Drainage Basin and Station	Number	Elev.	Profile Depth	(Inches) : Total : Capacity :	Soil Moisture Content (Inches) as of Oct. 1 1968                      1967                      1966		
<u>CRAB CREEK</u>							
Creston-Kunz	18B1m	2440	48	13.6	5.0	4.6	5.0
Jack Woods	18B3m	2600	48	13.6	7.1	5.2	4.3
Krause	18B4m	2440	48	13.6	5.2	4.9	5.1
Sheffels	18B5m	2360	48	13.6	4.9	3.7	3.8
Sherman	18B7m	2440	48	13.6	3.9	3.6	3.7
Wheatridge	18B6m	2200	48	13.6	4.6	4.0	4.1
<u>OKANOGAN</u>							
Salmon Meadows	19A2M	4500	48	5.4	2.7	1.5	3.0
Trout Creek	3-M	3600	48	7.3	4.1	4.0	3.8
<u>YAKIMA</u>							
Domery Flat	21B20m	2200	48	6.9	3.1	4.8	2.4
Lake Cle Elum	21B14M	2200	48	12.8	5.2	9.1	6.4
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	7.4	5.4	5.7
Helmers	17C2M	4400	48	12.0	7.6	6.7	6.7
<u>WENATCHEE</u>							
Upper Wheeler	20B7M	4400	48	12.7	5.5	5.6	5.7



# PRECIPITATION <sup>1/</sup>

## Division Averages and Departures

DRAINAGE DIVISIONS	Sept-Oct 1968 <sup>2/</sup>		WINTER Nov. '68 - Mar. '69 <sup>2/</sup>		SPRING April '68 <sup>2/</sup>	
	Observed-	Departure	Observed	- Departure	Observed-	Departure
Columbia in Canada	4.82	+0.93	11.49	-1.20	2.71	+1.33
Pend Oreille - Spokane	7.55	+3.67	20.07	+1.82	2.88	+0.55
Northeastern Washington	3.86	+1.49	12.35	+1.26	2.62	+1.19
Southeastern Washington	5.18	+2.53	14.33	+1.92	3.48	+1.60
Central Washington	4.78	+0.34	29.88	+2.75	1.75	-0.46
North Central Washington	1.05	-0.36	7.90	+1.56	2.05	+1.28
Northwest Slope Cascades	13.60	+1.93	47.27	-4.87	5.98	+0.07
Southwest Slope Cascades	10.97	+3.25	38.79	-2.08	3.98	-0.35

Northeastern Washington	- Lower Spokane, Colville, Sanpoil and lower Kettle drainages.
Southeastern Washington	- Touchet, Tucannon and Palouse drainages.
Central Washington	- Yakima, Wenatchee and Chelan drainages.
North Central Washington	- Methow and Okanogan drainages.
Northwest Slope Cascades	- Puget Sound drainages.
Southwest Slope Cascades	- Lower Columbia drainages.

<sup>1/</sup> - Preliminary analysis by U. S. Weather Bureau from data furnished by Meteorological Services of Canada and U. S. Weather Bureau.

<sup>2/</sup> - Departure from 15-year (1953-67) drainage division average

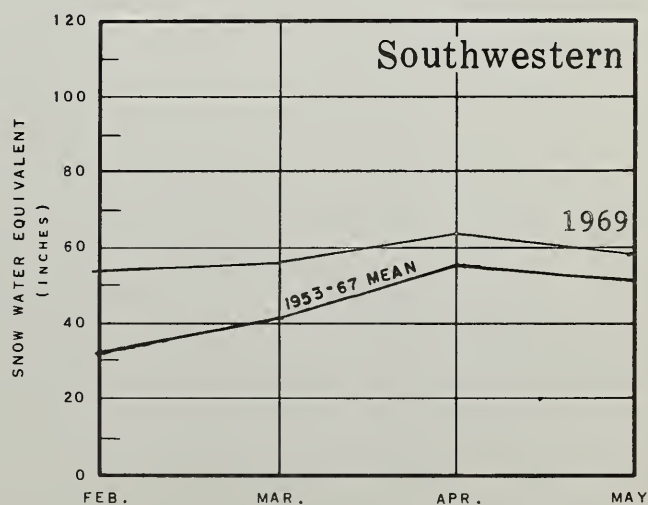
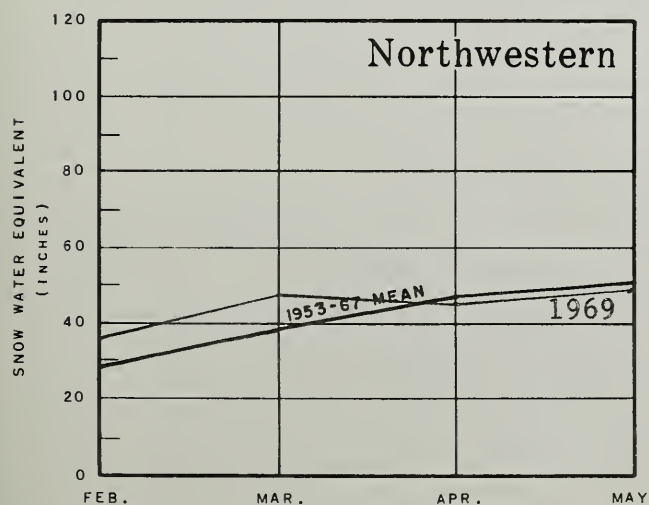
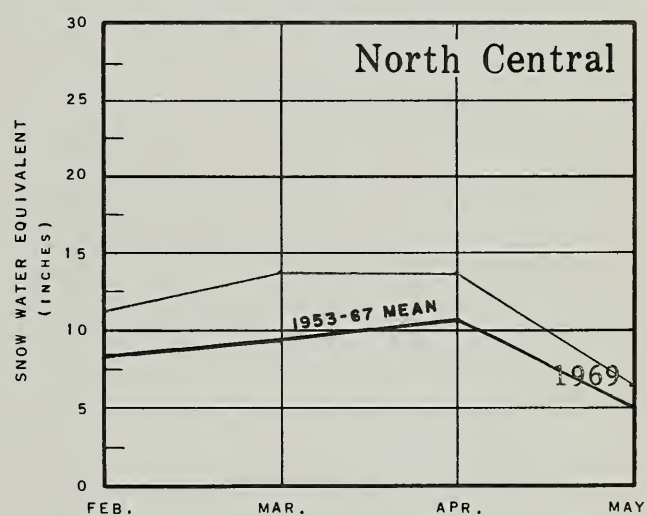
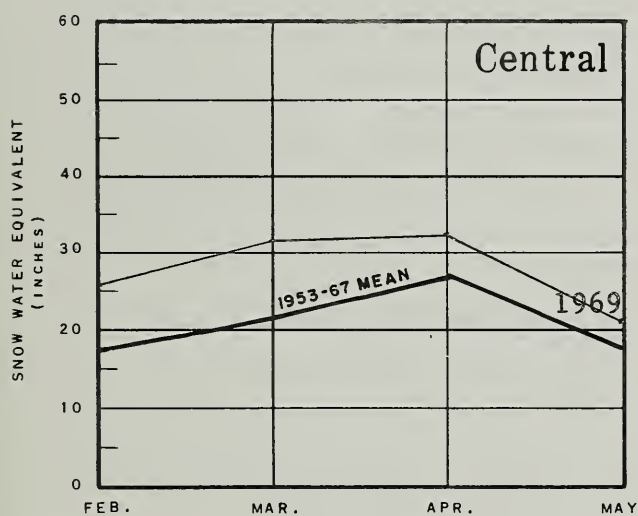
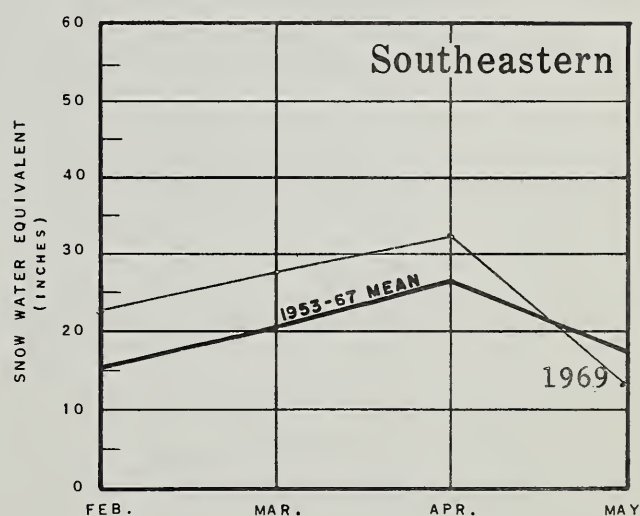
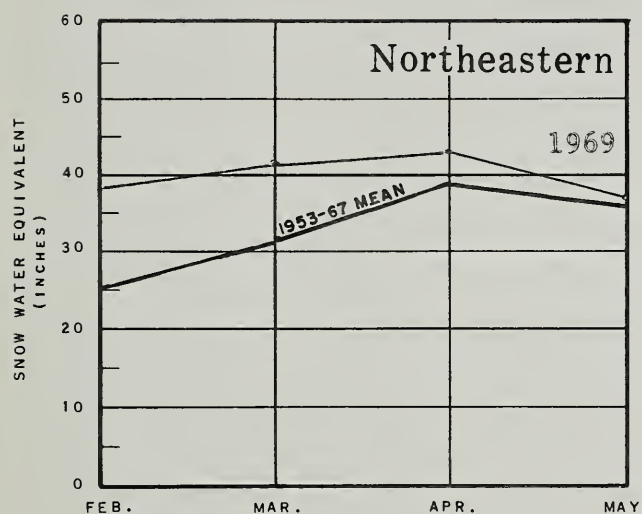




# WASHINGTON SNOW COVER

1969

## DRAINAGE AREAS



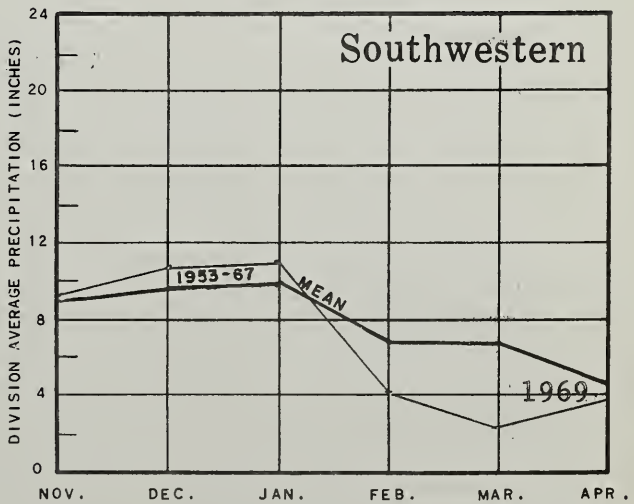
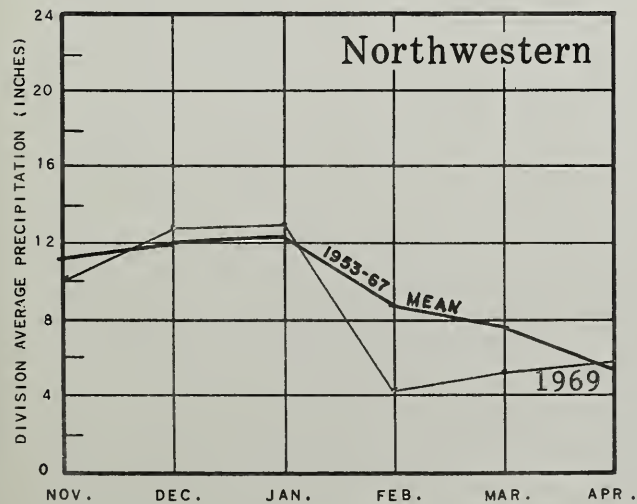
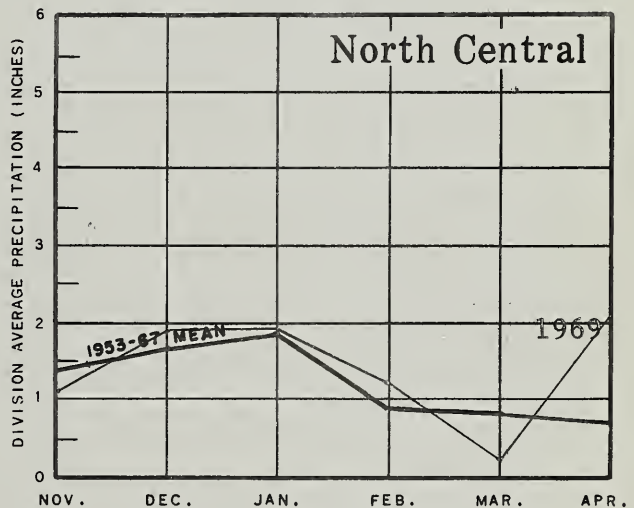
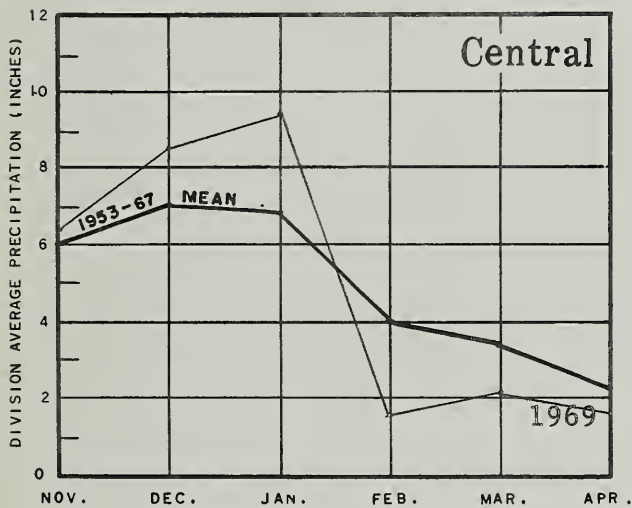
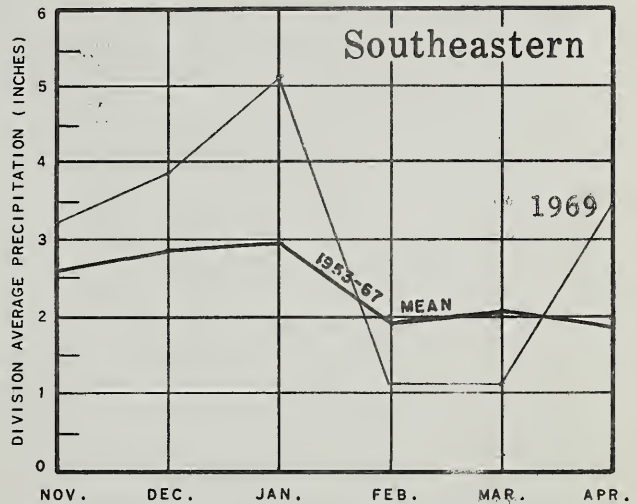
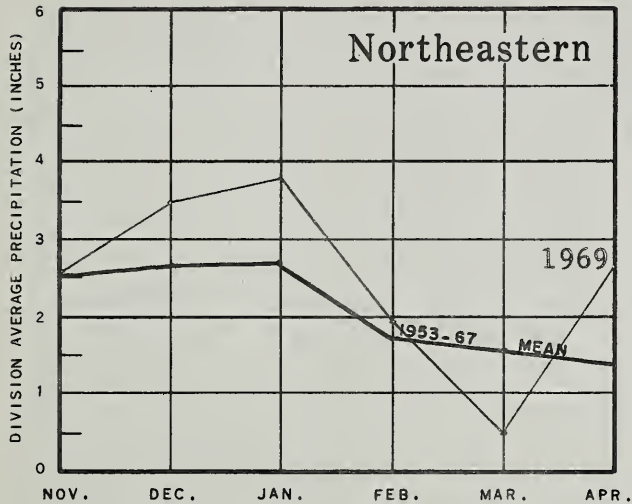




# WASHINGTON VALLEY PRECIPITATION

1968-1969

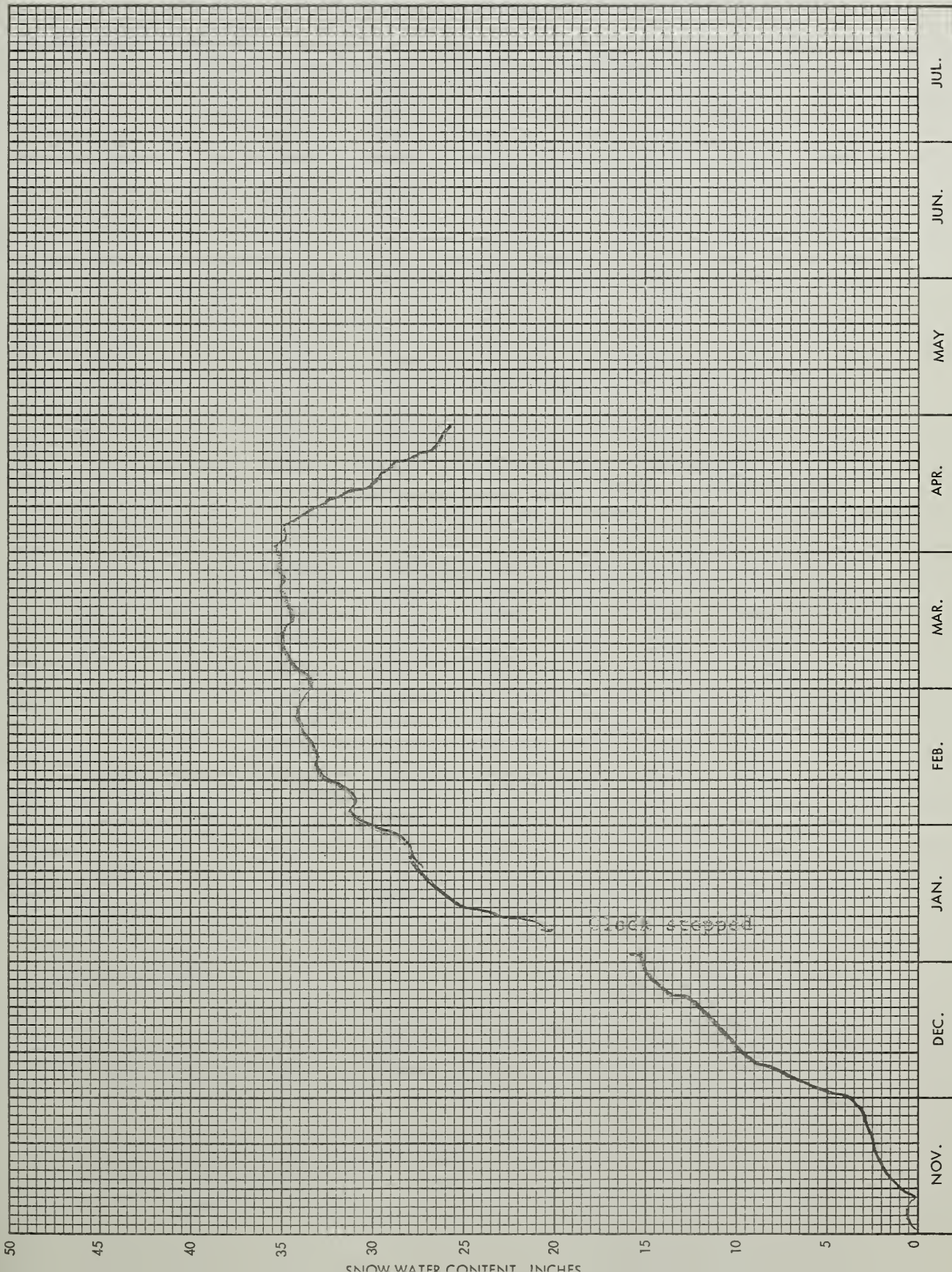
## DRAINAGE AREAS





# SNOW PILLOW DATA

Sec. 13 T. 26N R. 14E No. 21B41SP Drainage: Wenatchee  
 Lat. 47° 46' Long. 121° 01' Elev. 3170







APPENDIX 1  
SNOW DATA APRIL 1 to MAY 1, 1969

SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

U P P E R C O L U M B I A D R A I N A G E

PEND OREILLE RIVER

Baree Creek	15B11	5500	5/2	96	40.2	40.4	62.6	49.1
Baree Midway	15B16	4600	5/2	66	32.9	27.7	39.0	--
Benton Meadow	16A2	2344	5/1	0	0.0	0.0	0.0	0.0
Benton Spring	16A3	4900	4/29	37	16.2	11.8	22.9	17.1
Boyer Mountain	17A2	5250	4/28	53	26.8	23.8	27.4	25.2
Brush Creek	14A4	5000	4/29	16	16.6	8.3	15.0	10.8
Bunchgrass Meadow	17A1	5000	4/28	62	32.1	26.0	43.4	30.4
Hoodo Creek	15C1	6200	5/1	103	51.2	43.0	57.6	52.0*
Lookout	15B2	5250	4/16	88	42.9	31.0	41.9	--
			5/1	79	37.4	28.2	42.4	36.7
Mosquito Ridge	16A4A	5100	Not Measured			--	--	39.2*
Nelson	Canada	3050	4/30	14	5.8	6.0	9.0	6.0**
Schweitzer Bowl	16A6	4500	4/30	61	25.2	27.7	39.3	--
Schweitzer Ridge	16A5	6100	4/30	150	67.0	41.0	57.7	--
Smith Creek	16A1	4800	4/30	96	46.7	43.8	49.3	49.4
Winchester Creek	17A3	2970	4/29	11	4.1	0.0	0.0	0.5*

KETTLE RIVER

Barnes Creek	Canada	5500	5/4	44	17.1	26.1	26.4	21.1**
Big White Mountain	Canada	5500	4/29	54	19.6	20.2	27.2	--
Boulder Road	18A2	1450	4/25	0	0.0	0.0	0.0	--
Butte Creek	18A3	4070	4/25	15	6.0	5.8	8.1	--
Cabin Creek	18A8	3170	4/25	9	3.0	0.0	2.7	--
Carmi	Canada	4100	4/29	5	2.0	0.6	5.0	--
Farron	Canada	4000	4/30	25	12.5	12.0	15.6	--
Goat Creek	18A4	3595	4/25	0	0.0	0.0	0.0	--
Lower Trapping Cr.	Canada	3050	4/29	0	0.0	0.0	0.0	--
#Monashee Pass	Canada	4500	5/4	24	8.7	18.1	17.1	13.7**
Old Glory Mountain	Canada	7000	4/27	84	39.8	--	46.3	28.9**
Snow Caps Creek	18A5	2150	4/25	0	0.0	0.0	0.0	--
Snow Caps Trail	18A6	2720	4/25	0	0.0	0.0	0.0	--
Summit G. S.	18A7	4600	4/25	19	7.4	5.5	9.0	6.3*
Upper Trapping Cr.	Canada	5500	4/29	9	3.8	6.1	9.4	--

SPOKANE RIVER

Copper Ridge	16B2	4800	5/1	60	29.8	15.3	34.0	27.8
Forty-nine Meadows	15B3	5000	5/3	40	20.8	21.7	32.4	30.6*
Fourth of July Summit	16B3	3100	5/1	0	0.0	0.0	--	--

# Not located directly on this drainage

\* Adjusted 1953-67 average

\*\* Average for years of record



## APPENDIX 2

## SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

SPOKANE RIVER (Cont.)

Granite Peak	15B13A	6000	5/3	99	46.1	47.8	55.4	--
#Lookout	15B2	5250	4/16	88	42.9	31.0	41.9	--
			5/1	79	37.4	28.2	42.4	36.7
Lost Lake	15B14A	6000	5/3	148	73.0	56.4	65.8	62.7*
Lower Sands Creek	16B1	3400	5/2	42	18.7	8.2	16.6	14.6
Medicine Ridge	15B4A	6150	5/3	97	45.5	52.0	57.4	--
#Mosquito Ridge	16A4A	5110	Not Measured			--	--	39.2*
Outlaw Creek	15B12A	3750	5/3	0	0.0	3.0	13.2	8.0*

OKANOGAN RIVER

Aberdeen Lake	Canada	4300	4/30	0	0.0	2.5	4.8	--
Blackwall Mountain	Canada	6250	4/30	81	34.7	--	44.4	36.8**
Bouleau Creek	Canada	5000	4/29	24	9.1	11.6	--	7.2**
Brookmere	Canada	3200	4/28	10	3.5	6.8	9.0	5.6
Carrs Landing #1	Canada	2250	4/26	0	0.0	0.0	--	--
Carrs Landing #2	Canada	3200	4/26	0	0.0	0.0	--	--
Clark +	19A8a	7000	Not Measured			18.9	32.4	--
Enderby	Canada	6250	4/27	108	42.6	45.0	51.0	--
#Freezeout Meadows	20A2	5000	4/30	60	26.0	32.1	35.9	31.6
Hamilton Hill	Canada	4900	4/26	27	10.2	--	20.0	11.2**
#Harts Pass	20A5A	6500	5/2	110	49.0	55.1	56.5	49.8
Isintok Lake	Canada	5510	4/26	16	4.9	6.6	10.7	--
Lost Horse Mountain	Canada	6300	4/30	38	9.7	10.7	13.5	9.4**
McCulloch	Canada	4200	4/28	3	1.1	1.5	5.3	2.8
Missezula Mountain	Canada	5100	4/30	0	0.0	--	10.1	5.0**
Mission Creek	Canada	6000	4/29	57	21.1	23.6	26.1	21.5
Monashee Pass	Canada	4500	5/4	24	8.7	18.1	17.1	13.7**
Mount Kobau	Canada	5950	4/26	38	14.3	11.5	20.0	--
Mutton Creek No. 1	19A1	5700	4/25	26	11.2	7.2	20.0	10.0
Mutton Creek No. 2	19A4	6000	4/25	36	15.0	12.3	23.2	15.1
Nickel Plate Mtn.	Canada	6200	4/30	26	7.1	8.1	12.4	8.3**
Postill Lake	Canada	4500	4/30	16	5.9	7.8	8.6	6.6**
Rusty Creek	19A3	4000	4/25	0	0.0	0.0	2.8	1.3*
Salmon Meadows	19A2	4500	4/25	19	6.7	2.7	11.2	5.0*
Silver Star Mountain	Canada	6050	4/25	74	33.9	35.1	38.8	26.6**
Summerland Reservoir	Canada	4200	4/27	12	4.3	6.8	10.3	--
Trout Creek	Canada	4700	4/30	7e	3.4	3.3	7.3	4.2

# Not located directly on this drainage

\* Adjusted 1953-67 average

\*\* Average for years of record





## APPENDIX 3

## SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

METHOW RIVER

Harts Pass	20A5A	6500	5/2	110	49.0	55.1	56.5	49.8
#Mutton Creek No. 1	19A1	5700	4/25	26	11.2	7.2	20.0	10.0
#Mutton Creek No. 2	19A4	6000	4/25	36	15.0	12.3	23.2	15.1
#Rusty Creek	19A3	4000	4/25	0	0.0	0.0	2.8	1.3*
#Salmon Meadows	19A2	4500	4/25	19	6.7	2.7	11.2	5.0

CHELAN LAKE BASIN

Rainy Pass	20A9	4780	5/2	96	42.6	42.7	52.8	43.9
Safety Harbor	20A30A	6300	4/30	80	35.9	32.6	32.4	--

ENTIAT RIVER

Brief	20B19	1600	4/24	0	0.0	0.0	0.0	--
Entiat Meadows +	20A33a	4800	4/15	102	45.4	42.6	44.5	--
			4/30	82	38.5	37.4	44.8	--
Entiat River Trail +	20A34a	3150	4/15	36	16.5	11.8	22.0	--
			4/30	18	8.8	5.4	12.5	--
Fox Camp +	20A36a	6510	4/15	140	63.3	62.3	58.9	--
			4/30	135	63.5	57.7	64.6	--
Pope Ridge	20B20	4300	4/10	41	18.6	7.3	14.1	--
			4/28	16	8.0	0.0	14.4	--
Pugh Ridge +	20A32a	6400	4/15	89	39.6	35.7	35.3	--
			4/30	85	40.0	31.3	45.2	--
Shady Pass	20A37	5000	4/11	78	34.9	29.4	--	--
			4/29	70	33.0	27.6	--	--
Snow. Brushy +	20A35a	3850	4/15	75	33.4	33.0	41.4	--
			4/30	55	25.9	28.8	34.5	--
Tommy Creek +	20B21a	5300	4/15	52	23.8	21.3	26.6	--
			4/30	44	20.7	14.6	31.9	--

WENATCHEE RIVER

Berne-Mill Creek	21B23	2925	4/29	56	25.3	13.0	25.8	18.2*
Berne-Mill Creek New	21B41SP	3240	4/29	49	23.6	6.2	--	--
Blewett Pass No. 2	20B2	4270	4/16	36	18.7	5.0	9.8	--
			4/30	25	12.9	0.0	11.7	8.9
Chiwaukum G. S.	20B16	1810	4/29	5	2.2	0.0	0.0	--
#Fish Lake	21B4	3371	4/26	63	30.9	12.8	29.6	24.1*
Lake Wenatchee	20B5	1970	4/29	0	0.0	0.0	0.0	--

# Not located directly on this drainage

+ Snow water equivalent estimated from aerial stadia observations

\* Adjusted 1953-67 average



## APPENDIX 4

## SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1966	1967	1953-67 Avg.
<u>WENATCHEE RIVER (Cont.)</u>								
Leavenworth R. S.	20B17	1127	4/14	0	0.0	--	0.0	--
Merritt	20B18	2140	4/29	9	4.4	0.0	0.0	--
Stevens Pass	21B1	4070	4/15	130	65.0	31.5	--	55.7*
			4/29	127	62.4	35.2	62.5	53.5
Stevens Pass Sand Shed	21B45	3700	4/15	84	40.5	--	--	--
			4/29	82	38.4	17.3	17.7	--
<u>SQUILCHUCK CREEK</u>								
Beehive Springs	20B3	4400	4/28	8	3.5	0.0	3.8	--
Scout-A-Vista	20B4	3400	4/28	0	0.0	0.0	2.3	--
<u>STEMILT CREEK</u>								
Jump-Off	20B8	4450	4/28	10	4.2	0.0	6.6	--
Stemilt Slide	20B6	5000	4/28	17	8.4	4.6	11.3	--
Upper Wheeler	20B7	4400	4/28	0	0.0	0.0	3.7	--
<u>COLOCKUM CREEK</u>								
Colockum Creek	20B22	5300	4/29	27	13.7	6.2	--	--
Colockum Creek No. 2	20B23	4300	4/29	0	0.0	0.0	--	--
<u>YAKIMA RIVER</u>								
#Ahtanum R. S.	21C11	3100	5/1	0	0.0	0.0	0.0	--
Big Boulder Creek	21B9	3200	4/26	26	11.7	0.0	5.6	5.0*
#Blewett Pass No. 2	20B2	4270	4/16	36	18.7	5.0	9.8	--
			4/30	25	12.9	0.0	11.7	8.9
Bumping Lake	21C8	3450	5/1	18	9.1	0.0	11.6	10.5
Bumping Lake New	21C36	3400	5/1	25	12.9	0.0	--	--
Fish Lake	21B4	3371	4/26	63	30.9	12.8	29.6	24.1*
Lake Cle Elum	21B14M	2200	5/1	0	0.0	0.0	0.0	--
Morse Lake	21C17	5400	4/29	138	66.3	47.8	83.2	62.4*
#Olallie Meadows	21B2	3625	4/15	99	50.0	20.1	52.0	--
			4/25	105	52.9	23.5	56.7	48.1
#Satus Pass	20D1	4030	4/29	6	2.5	0.0	0.0	--
#Stampede Pass	21B10	3000	4/14	108	50.3	22.0	--	--
			5/1	113	56.3	23.2	57.1	46.0
Lemah Creek +	21B47a	3327	4/25	60	28.2	New Aerial Marker		
Tunnel Avenue	21B8	2450	4/30	43	20.4	1.1	13.2	--
White Pass (E. Side)	21C28	4500	4/30	58	29.0	10.2	28.4	26.2*

# Not located directly on this drainage

+ Snow water equivalent estimated from aerial stadia observation

\* Adjusted 1953-67 average





## APPENDIX 5

## SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

AHTANUM CREEK

Ahtanum R. S.	21C11	3100	5/1	0	0.0	0.0	0.0	0.0*
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LOWER COLUMBIA DRAINAGEASOTIN CREEK

Spruce Springs	17C4	5700	4/29	57	26.2	16.5	24.0	--
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MILL CREEK

Tollgate	18D3M	5070	4/29	30	13.8	0.0	9.9	17.5
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KLICKITAT RIVER

Satus Pass	20D1	4030	4/29	6	2.5	0.0	0.0	--
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WHITE SALMON RIVER

Cultus Creek	21C12	4000	4/26	114	57.4	31.5	59.3	47.8*
#Surprise Lakes	21C13A	4250	4/26	115	59.3	31.1	61.9	50.5

WIND RIVER

#Old Man Pass	21D19	3100	4/26	52	24.9	2.6	19.3	11.4*
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LEWIS RIVER

Blue Lake +	21C22a	4800	4/26	196	98.0	61.3	106.0	90.1*
Bob's Trail	21C21	2200	4/27	32	14.1	0.0	15.6	5.7*
Calamity Ridge +	22D1a	2500	4/26	10	4.6	0.0	0.0	--
Council Pass +	21C18a	4200	4/26	84	42.8	22.9	48.2	35.7*
#Cultus Creek	21C12	4000	4/26	114	57.4	31.5	59.3	47.8
Divide Meadow +	21C29a	5600	4/26	118	61.4	43.9	73.9	61.6*
Grand Meadow	21C25	3500	4/26	47	22.8	6.5	30.1	22.2*
Lone Pine Shelter	21C26	3800	Not Measured			32.3	56.8	45.3*
Marble Mountain +	22C5a	3200	4/26	88	48.4	3.5	39.5	--
New Muddy River	22C6	1400	4/27	3	1.1	0.0	0.0	--
Old Man Pass	21D19	3100	4/26	52	24.9	2.6	19.3	11.4*
Plains of Abraham +	22C1a	4400	4/26	188	94.0	51.7	92.0	73.8*
Smith Creek Road	22C4	2100	4/26	31	14.8	0.0	5.7	--
Spencer Meadow +	21C20a	3400	4/27	53	26.0	0.0	25.3	13.0*

# Not located directly on this drainage

+ Snow water equivalent estimated from aerial stadia observation

\* Adjusted 1953-67 average



## APPENDIX 6

## SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

LEWIS RIVER (Cont.)

Surprise Lakes	21C13A	4250	4/26	115	59.3	31.1	61.9	50.5*
Table Mountain +	21C24a	4200	4/26	95	48.4	29.9	56.9	44.7*
Timbered Peak +	21C18a	3000	4/26	38	19.0	0.0	21.4	12.3*

COWLITZ RIVER

#Plains of Abraham +	22C1a	4400	4/26	188	94.0	51.7	92.0	73.8
#White Pass (E. Side)	21C28	4500	4/30	58	29.0	10.2	28.4	26.2*

PUGET SOUND DRAINAGEWHITE RIVER

#Morse Lake	21C17	5400	4/29	138	66.3	47.8	83.2	62.4*
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GREEN RIVER

Cougar Mountain SP	21B42SP	3200	4/25	41	18.6	3.2	28.8	--
Snowshoe Butte SP	21B43SP	5000	4/25	153	70.5	44.1	--	--
Stampede Pass	21B10	3000	4/14	108	50.3	22.0	--	--
			5/1	113	56.3	23.2	57.1	46.0

SNOQUALMIE RIVER

Olallie Meadows	21B2	3625	4/15	99	50.0	20.1	52.0	--
			4/25	105	52.9	23.5	56.7	48.1

SKYKOMISH RIVER

#Stevens Pass	21B1	4070	4/15	130	65.0	31.5	--	55.7*
			4/29	127	62.4	35.2	62.5	53.5
#Stevens Pass Sand Shed	21B45	3700	4/15	84	40.5	--	--	--
			4/29	82	38.4	17.3	17.7	--

SKAGIT RIVER

Beaver Creek Trail	21A4	2200	4/30	20	9.0	2.2	7.3	5.6*
Beaver Pass	21A1	3680	4/30	81	36.8	31.4	40.6	35.0
Devils Park	20A4	5900	5/2	101	44.6	51.6	57.4	49.2
Freezeout Cr Trail	20A1	3500	4/30	17	6.2	6.0	12.8	8.3

# Not located directly on this drainage

+ Snow water equivalent estimated from aerial stadia observation

\* Adjusted 1953-67 average





## APPENDIX 7

## SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1966	1967	1953-67 Avg.

SKAGIT RIVER (Cont.)

Freezeout Meadows	20A2	5000	4/30	60	26.0	32.1	35.9	31.6
#Harts Pass	20A5A	6500	5/2	110	49.0	55.1	56.5	49.8
Lake Hozomeen	21A2	2600	4/30	16	5.9	3.9	5.9	5.8
Meadow Cabins	20A8	1900	5/2	0	0.0	0.0	0.0	2.0*
#Rainy Pass	20A9	4780	5/2	96	42.6	42.7	52.8	43.9
Thunder Basin	20A7	4200	5/2	61	26.8	18.0	28.4	26.9*

BAKER RIVER

Dock Butte +	21A11A	3800	5/3	175	81.8	60.8	94.6	87.1*
Easy Pass	21A7A	5200	4/16	177	84.0	--	109.5	--
			5/3	190	88.3	85.0	110.2	107.4*
Jasper Pass	21A6A	5400	4/16	206	95.4	--	122.4	102.6*
			5/3	216	99.3	98.8	122.4	113.6*
Komo Kulshan	21A17	800	4/16	16	6.9	--	--	--
			5/3	0	0.0	0.0	0.0	--
Marten Lake +	21A9A	3600	4/16	180	82.8	--	102.8	92.3*
			5/3	190	89.2	64.7	100.2	93.3*
Mount Blum +	21A18a	5800	4/16	138	63.4	--	--	--
#Panorama New	21A5	4300	4/11	171	80.8	New Course		
			4/28	172	89.3			
Rocky Creek	21A12A	2100	4/16	80	36.9	--	41.8	31.8*
			5/2	70	33.7	18.4	39.8	20.4*
Schreibers Meadow	21A10A	3400	4/16	154	73.0	--	84.6	70.5*
			5/3	154	73.2	56.0	83.8	73.7*
S. F. Thunder Creek	21A14A	2200	5/3	0	0.0	0.0	0.0	--
Sulphur Creek	21A13	1600	4/16	36	16.7	--	13.4	--
			5/2	23	10.1	0.0	8.7	--
Three Mile Creek	21A8A	4500	5/3	0	0.0	0.0	0.0	--
Watson Lakes	21A8A	4500	4/16	170	76.4	--	89.8	79.7*
			5/3	181	84.8	63.5	90.7	83.6*

NOOKSACK RIVER

Panorama New	21A5	4300	4/11	171	80.8	New Course		
			4/28	172	89.3			

OLYMPIC PENINSULADUNGENESS RIVER

Deer Park	23B4	5200	4/28	58	27.3	19.1	33.8	24.3*
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# Not located directly on this drainage

+ Snow water equivalent estimated from aerial stadia observation

\* Adjusted 1953-67 average



## APPENDIX 8

## SNOW

DRAINAGE BASIN and SNOW COURSE			1969			PAST RECORD		
			Date of Survey	Snow Depth (in.)	Water Content (in.)	Water Content (in.)		
Name	No.	Elev.				1968	1967	1953-67 Avg.

MORSE CREEK

Cox Valley	23B14	4500	4/26	115	56.1	35.9	--	--
Deer Park G. S.	23B13	4850	4/28	32	15.8	5.7	22.8	--

ELWHA RIVER

Hurricane	23B3	4500	4/27	82	35.4	20.8	38.4	--
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# Agencies Assisting with Snow Surveys

## GOVERNMENT AGENCIES

### Canada:

Department of Lands, Forests and Water Resources,  
Water Resources Service, British Columbia

### States:

Washington State Department of Water Resources  
Washington State Department of Natural Resources

### Federal:

Department of the Army  
Corps of Engineers  
U. S. Department of Agriculture  
Forest Service  
U. S. Department of Commerce  
Weather Bureau  
U. S. Department of the Interior  
Bonneville Power Administration  
Bureau of Reclamation  
Geological Survey  
National Park Service

## PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.  
Pacific Power and Light Company  
Puget Sound Power and Light Company  
Washington Water Power Company

## OTHER PUBLIC AGENCIES

Okanogan Irrigation District  
Wenatchee Heights Irrigation District

## MUNICIPALITIES

City of Walla Walla  
City of Tacoma  
City of Seattle

*Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.*

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